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THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume IX | JULY, 1936 | No. 4

Cleveland Is City of Many Conventions

Presents Excellent Location and Facilities for Holding Metal Congress

Cleveland, "Convention City"—the sobriquet will indeed be well earned at the end of a summer which includes a myriad of such important events as the Republican National Convention, the American Legion Convention, the Great Lakes Exposition, the Townsend Convention, and on Oct. 19 to 23, the high spot in the metalman's year, the 18th National Metal Congress and Exposition.

Industrially, Cleveland offers the ideal background for the Metal Congress. Iron and steel have formed Cleveland's major industries since 1828 when the first smelter was established. Cleveland's smelters today have a capacity of three million tons of pig iron annually.

A large number of plants in diversified fields will be opened to visitors at the Congress.

City Leads in Many Products

The city leads in the production of wire nails, bolts and screws, malleable castings and heavy machinery. The yearly output of motor vehicles, bodies and parts is valued at more than $150,000,000. More than $98,000,000 worth of iron and steel mill products are manufactured each year.

The Public Auditorium, one of the world's largest, most modern and most complete, offers excellent accommodations for the National Metal Exposition.

Ready Transportation Available

Cleveland is located within an overnight's ride of half the population of the United States and Canada. Every means of transportation—air, water, motor, rail—is readily available to those attending the Congress.

Hotel accommodations are of the best, and the meeting rooms are well suited to take care of the technical sessions which constitute a stellar attraction at the Congress.

To those who seek recreation and entertainment, facilities are varied.

(Continued on page 4)

Climax Molybdenum Co. Builds New Laboratory

The Climax Molybdenum Co. of Michigan has broken ground for a new laboratory on Woodrow Wilson Ave., just north of the Belt line tracks in Detroit. The one-story building will cost approximately $80,000, and will contain laboratory and testing equipment to the value of $20,000.

This new laboratory is to serve purely for development work in connection with the promotion of sales of molybdenum and molybdenum compounds. This service will be furnished to customers and prospective customers at no charge.

Any work done at the request of a customer or prospect will be treated as strictly confidential and no information will be divulged without the customer's permission.

Where Congress Visitors Will Arrive

The Terminal Tower and Union Depot as seen from the west end of the High Level Bridge. The new Post Office is in the foreground and the Telephone Building at the extreme right. Other buildings in the Terminal group include the Cleveland Hotel, the Midland Building, the Republic Building, and the Builders' Exchange Building.

A. S. M. Annual Meeting

To the Members of the A.S.M.:

This is your official notice that the annual meeting of the American Society for Metals will be held in the ballroom of the Statler Hotel, Cleveland, Ohio, on Wednesday morning, Oct. 21, 1936. All member of the Society in good standing are privileged to attend and vote.

W. H. Eisenman, Secretary.

Cleveland, Ohio, July 15, 1936

Alumni Plan to Meet

Luncheons Will Be Held During Metal Congress in Fall

A new feature of the annual National Metal Congress, meeting this year in Cleveland, will be a group of alumni luncheons to be held on Wednesday, Oct. 21, immediately following the annual meeting of the American Society for Metals and the presentation of the Campbell Memorial Lecture.

University of Michigan, Case School of Applied Science, Lehigh University, Massachusetts Institute of Technology, and Carnegie Institute of Technology will sponsor the luncheons. Alumni of these schools attending the Congress who are interested in the luncheons should get in touch with Col. A. E. White at University of Michigan, Dr. K. H. Donaldson at Case School, Prof. Bradley Stoughton at Lehigh, Dr. George B. Waterhouse at M.I.T., and Dr. R. F. Mehl at Carnegie Tech.

It would also be of great value if names of other alumni in the metallurgical field could be submitted to these men, who are in charge of the various groups. This would facilitate the rather difficult task of making up as complete as possible a mailing list of alumni who are planning, or should plan, to attend the Congress.

Lindberg Opens Office in Detroit

Lindberg Engineering Co., 221 Union Park Court, Chicago, has announced the opening of a Detroit office at 7338 Woodward Ave.

New Englanders Join in One-Day Sectional Meeting

By Carl G. Johnson

The New England Sectional Meeting of the American Society for Metals, held on June 5 in Worcester, proved to be a huge success, with more than 200 members and guests attending.

Registration started at nine o'clock in the morning, and at ten the technical session got under way. The principal speaker was National Vice-President Edgar C. Bain with Dr. George B. Waterhouse serving as technical chairman.

Mr. Bain presented an excellent talk on "The Role of the Individual Alloying Elements in Steel." The subject was covered in his characteristically thorough manner. The talk was exceptionally well illustrated, and those who heard Mr. Bain praised his efforts highly.

A delicious lunch was followed by messages from some of the distinguished members and guests, including National Secretary Bill Eisenman, Mr. Bain, and John Higgins, president of the Worcester Pressed Steel Co. Rodman Tatnall, chairman of the Worcester Chapter, acted as toastmaster.

The afternoon was devoted to plant trips and golf parties at Wachusett Country Club. The plants visited were the South Works, North Works, and Central Works Research Laboratory of the American Steel & Wire Co., the Worcester Pressed Steel Co., and the Norton Co. They were well patronized, and those who took advantage of these opportunities were well repaid.

Preprints of papers for the National Metal Congress are listed on page 6 and may be ordered now.

Hotel reservations should also be sent in early. See page 3 for room rates.

Fifty Technical Papers Are on Show Program

Additional Floor Space Required To Accommodate Exhibitors In Metal Exposition

With all of the exhibit space originally laid out for the National Metal Exposition already reserved by 180 exhibiting firms, and with more than 50 papers planned for a full and varied series of technical sessions, the National Metal Congress, to be held in Cleveland, Oct. 19 to 23, bids fair to excel all others held in previous years.

So unprecedented was the advance sale of exhibit space that it was necessary on July 1 to lay out an additional 6,000 sq.ft. of floor space in Cleveland's Public Auditorium. This will give a total of 71,000 sq.ft. of space to accommodate the large number of firms exhibiting their products and processes in this show.

Headquarters at Statler

Headquarters for the American Society for Metals and the American Institute of Mining and Metallurgical Engineers will be at the Statler Hotel. Reservations should be made direct to the hotel; rates are given on page 3.

The American Welding Society, the Wire Association, and the American Society of Mechanical Engineers will have headquarters at the Cleveland Hotel.

Symposium on Plastic Working

Technical sessions will be held daily during the Congress at both the Statler and the Public Hall. An outstanding feature will be a symposium on the plastic working of metals, which will consist of about 20 papers presented during four half-day sessions.

Because of the large number of valuable papers both on this and other diverse and timely subjects, it is planned to hold several simultaneous sessions in order to provide ample time for presentation and discussion.

Preprints May Be Ordered

The papers are now being prepared for preprinting and will be ready for distribution about Sept. 15. They may be ordered now from the list given on page 6.

Other educational activities during the Congress will include two lecture courses—a series of five lectures on physical testing by Harry D. Churchill, associate professor of mechanics at Case School of Applied Science, and a three-lecture evening course on X-ray analysis by Kent R. Van Horn, research metallurgist, Aluminum Co. of America, Cleveland.

Research Publication Issued

A new type of publication entitled "Research, Illustrated" has been instituted by E. F. Houghton & Co. It is designed to give detailed technical information rather than pure advertising.

The first edition was devoted to textile processing. Others will cover transmission, lubrication, and metal working.

Men in industry desiring to be placed on the mailing list are invited to write E. F. Houghton & Co., 240 W. Somerset St., Philadelphia.

THE REVIEW

Published bi-monthly by the

American Society for Metals

7016 Euclid Ave., Cleveland, O.

R. S. ARCHER, *President*
E. C. BAIN, *Vice-President*
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Subscriptions fifty cents a year; five cents a copy. Entered as Second Class Matter, July 26, 1930, at the Post Office at Cleveland, Ohio, under the Act of March 3, 1879.

RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

Cleveland, O., July, 1936
Volume IX No. 4

Enthusiasm High At Final Meeting Of N'Dame Group

By Walter C. Troy

Notre Dame Group, May 19—The final meeting of the season was held at the Oldenburg Inn in South Bend.

Following a banquet, the secretary's and treasurer's reports were read. The former disclosed the gratifying fact that an increasing portion of the enrollment is being composed of senior members—industrial men from South Bend and vicinity.

The Nominating Committee presented nominees for the various offices, and the names of those elected will be found in another section of this paper.

Following the essential business, Dr. E. G. Mahin, head, Department of Metallurgy of Notre Dame University, addressed the members. His remarks included a brief discussion of extensive developments in the Department of Metallurgy at the University for the coming year, and some progressive ideas for extending the sphere of influence of the Notre Dame Group of the Society.

This discussion held the interest of everyone present, and the members adjourned for the summer with a spirit that is sure to promote and further the progress that has characterized the Group during the past few years.

Pyrometers Described in Leeds & Northrup Catalog

Written in simple, non-technical language, well illustrated, a new 52-page catalog just issued by Leeds & Northrup describes "Micromax Thermocouple Pyrometers." It explains the potentiometer method of measurement—the operation of the rugged, yet simple, mechanisms through which this balance method is made available to industry.

The new Silver-Anniversary Micromax, a thoroughly modern machine, is described in detail. Set forth for ready comparison is also the complete line of Micromax instruments, indicating, recording, signaling, controlling or combinations of these functions.

This new catalog contains a wealth of information which everyone who uses or specifies pyrometers will want. Write for Catalog N-33A, Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia.

Story of Iron and Steel Is Depicted

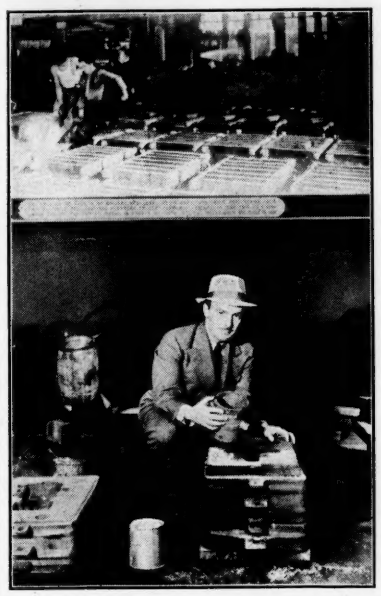
Great Lakes Exposition Exhibit Prepared by Bates

"The Romance of Iron and Steel"—one of the major exhibits of the Great Lakes Exposition being held in Cleveland from June 27 to October 4—was developed by Dr. A. Allen Bates, associate professor of metallurgy at Case School of Applied Science.

The exhibit includes a full-size iron ore mine shaft, a portion of a blast furnace built full size, and a 125-ton ladle for pouring steel into ingot molds. Models of a continuous hot strip mill and an automatic stamping press form miniature automobile parts. An immense relief map of the Great Lakes Region and a series of huge murals give a remarkably clear panoramic view of this gigantic industry.

Dr. Bates, who graduated from Ohio Wesleyan University and received his metallurgical degree from Case, has also studied extensively abroad. He is perhaps best known to the American Society for Metals for his lecture course on the fundamentals of ferrous metallurgy, which has proven so popular in recent years as a chapter educational activity.

Sponsors Exhibit



Dr. A. Allen Bates, director of the Romance of Iron and Steel Exhibit at the Great Lakes Exposition, Cleveland, is shown inspecting a casting in one corner of the display, devoted to a model foundry floor. A portion of one of the Exhibit's murals showing casting of iron appears in the background.

New Publication Promotes October "Metal Progress"

Metal Progress Pourings, Devoted to National Metal Show Number, Will Appear at Regular Intervals Until October

The publishing horizon glowed last week as the first issue of *Metal Progress Pourings* went into the mail.

Sponsored by the American Society for Metals, *Pourings* will be published regularly during the next few weeks to acquaint the metal industries with the advantage of presenting their sales stories in the National Metal Show number of *Metal Progress*, published just prior to the opening of the National Metal Congress, Oct. 19.

President Gives Interview

In an exclusive interview with Robert S. Archer, president of the Society and chairman of the editorial committee of *Metal Progress*, a *Pourings* reporter learned that the forthcoming October issue will present a complete and comprehensive preview of the program and activities scheduled for the Metal Congress. "This section will give A.S.M. members a glimpse of the diversified schedule awaiting them at the Show which their Society is staging," Mr. Archer said.

He pointed out that one of the most important innovations ever made by a business publication was made in the 1934 Metal Show issue of *Metal Progress*. "In that year, the October Show number appeared with editorial material classified into ten individual sections.

"These sections covered, editorially, every important branch of the metal industry, with the result that readers could easily find material on any particular subject in one portion of the magazine.

Show Issue Is Reference Book

"And more than that," Mr. Archer continued, "these ten sections made this annual Show number an authoritative, convenient reference of metal working practices. From my own experience as a reader, I know that these ten sections have transformed a special annual issue into a book that has, conservatively speaking, a five-year lifetime of usefulness."

REVIEW readers who have not received *Pourings* should write for their copy today if they are interested in presenting a sales story to the technical and practical executives in the metal industries at the time of the show.

However, it is only fair to warn readers of THE REVIEW that once you're on the list to receive *Pourings*, you're on to stay! Editorial sensitivity is the reason for this. The *Pourings* editor takes every subscription cancellation as a personal affront.

For this reason the publisher has made it a policy to ignore any cancellations. This leaves the editor with an active zest in his work—ever alert to print all the news of the October National Metal Show number of *Metal Progress*.

Open-Hearth Slag Control Talk by Earnshaw Cook Pleases Pittsburgh Men

By A. W. Demmler

Pittsburgh Chapter, May 14—To satisfy a steel town audience on the subject of "Slag Control in the Basic Open-Hearth" in one short hour is no small undertaking.

A highly commendable job was done, however, by Earnshaw Cook, research metallurgist of the American Brake Shoe and Foundry Co., Mahwah, N.J., at the May meeting. His talk — particularly his frank comments during the discussion—was very much appreciated.

Consistency of results depends on quality of raw materials, uniformity of practice, and close cooperation between blast furnace, open-hearth, and metallurgical departments.

The effects of slag oxidation and balanced deoxidation upon the quality of rimmed and killed steels received the major attention. The influence of changing lime-silica ratios and several methods of slag control were discussed briefly.

Mr. Cook presented detailed data from hundreds of commercial heats to demonstrate the influence of silicon content of hot metal additions on the quality of the product, the effect of iron oxide content of the slag (not always consistent with that in the steel) on chipping costs, and the effect of relative deoxidation upon rejections.

GLEANINGS
From the Chapters

Lion Goes in; Goat Comes Out

The lion and the lamb may mix it up in March but it's the lion and the goat in June. Lion d'Arcambal seemed to come out on the wrong end of all competitions with Goat Keshian except the Spanish sport of bull-throwing, according to Chapter Reporter Raymond on page 3.

The Fun Begins

Hartford and New Haven are not the only chapters, however, to forget their serious purposes and aspirations when vacation time comes around. . . . Philadelphians journeyed to Phillipsburg for a day's outing replete with golf, beer, a plant inspection, and food. . . . Clevelanders reveled in baseball, golf, pingpong, and prizes. . . . Worcester had more golf and prizes. . . . Chicago invited the ladies and included music. . . . Northwest was entertained primarily by "Gas Producer" Dowdell. . . . Plant visits and golf featured the New England sectional meeting.

Etc., etc., ad infinitum. . . .

Bates Again

Cleveland's indefatigable Al Bates steps into the limelight again by sponsoring the "Romance of Iron and Steel" Exhibit at the Great Lakes Exposition. It should be worth a visit by all members who can get to Cleveland during the summer.

More Members

Notre Dame—primarily a student group—proudly announces the acquisition of more members from among the industrial men of South Bend. . . . And Detroit topped the chapter list with 34 new members last month.

Alumni Wanted

All members who are alumni of Michigan, Case, Lehigh, M.I.T., or Carnegie Tech should make it a point to attend the luncheons to be held on Wednesday of Metal Week. Any assistance in contacting alumni who should be present will be greatly appreciated. Get in touch with the men listed on page 1.

A Matter of Enthusiasm

We note that the Washington Chapter lays claim to a record amount of total chapter enthusiasm. . . . Other chapters may dispute this claim, but we hope it causes no serious arguments.

Welding Symposium Planned for Congress

A "Welding Practice Symposium" will form part of the program planned by the American Society of Mechanical Engineers during the National Metal Congress.

This symposium, scheduled for Thursday and Friday, Oct. 22 and 23, is a joint effort of the Machine Shop Practice, Iron and Steel, and Applied Mechanics Divisions of the A.S.M.E. The American Welding Society will also cooperate in these sessions, which will be held in the ballroom of the Cleveland Hotel.

Mo-W Steel Is Emmons' Topic

New High Speed Steel Compares Favorably With Standard 18-4-1 Variety

By J. W. McBean

Ontario Chapter, May 1—Molybdenum-tungsten high speed steel was the topic of Joseph V. Emmons of Cleveland Twist Drill Co., at the last regular meeting of the season. The variety containing about 8 to 9.5% molybdenum and 1.5% tungsten received most attention.

Molybdenum was experimented with quite early in the history of high speed steel, but its use was soon abandoned. A reduction in cost and the fact that it can be readily obtained on this continent led to a revival of interest, and after a good deal of experimental work it was found possible to approach the 18-4-1 variety of high speed steel in performance.

Early difficulties were had with its susceptibility to grain growth, which vanadium did not entirely suppress. It was finally found that the use of about 20% as much tungsten as molybdenum helped materially.

Carbon Is 0.64 to 0.84%

This steel takes more carbon into solution than the 18-4-1 variety, and it usually contains about 0.64% to 0.84% C, according to whether toughness or hardness is the more important.

As now produced, it appears to give even better results than standard varieties of high speed steel, being harder for the same toughness or tougher for the same hardness.

Hardening and forging temperatures are considerably lower; for instance, the best hardening temperature is about 2200° F. instead of 2350° F. It can be forged as readily in the range of 1950 to 1700° F. as the standard variety can in the higher range.

Machinability Is Good

Molybdenum-tungsten steel can be made harder than the 18-4-1 variety, but is softer in the annealed condition. This, because of better machinability, gives it a manufacturing advantage.

In using any high speed steel, inspection is very important due to the expensive work put on it later. Samples of the steel when first received should therefore be hardened and tempered and examined for fracture and hardness before tools are made from it.

This molybdenum-tungsten steel may be varied in composition in a similar way to the standard varieties. Cobalt, for instance, may be added to increase hardness although it decreases toughness.

In answering one of the numerous questions submitted, Mr. Emmons said that reamers made from it had exceptional hardness and produced an excellent finish on the work.

Golf Features Meeting

By Carl G. Johnson

Worcester Chapter, May 21—The annual meeting of the Chapter was held at Hillcrest Country Club. About 40 members and guests enjoyed an afternoon of golf and an excellent dinner, followed by the drawing of attendance prizes.

Chairman Bradford Reed gave a short talk on the activities of the Chapter during the past year and read the annual report of the secretary-treasurer, George Peterson, who was absent because of illness.

Mr. Reed then introduced the new officers of the Worcester Chapter. The party finally dispersed after a very enjoyable social get-together.

Impact Value Is Index To Properties of Metal At Low Temperatures

By Louie W. Mosley

Los Angeles Chapter, June 4—The most important index to the suitability of metals for low temperature applications is the impact value, according to E. W. Gard, addressing the first meeting of the fiscal year.

Mr. Gard is development engineer of Union Oil Co., and described the problems involved in erecting a plant at Oleum, Calif., embodying new refining methods that require operating temperatures of -50 to -55° F. They were without a precedent in choosing a suitable steel to resist high stresses at these low temperatures.

In a field hitherto almost unexplored, a monumental task was faced in determining the proper specification, devising tests, developing the proper heat treatment, and solving some rather difficult fabrication problems.

The impact value of steel shows a sudden break below 32° F. and particularly below 0° F. Nickel proved to be the most practical alloying element in improving impact values and 2.25% Ni steel was decided upon.

Heat treatment was found necessary to refine the grain; normalizing at 1450° F. and drawing at 1250° F. was satisfactory. Working and drawing the metal improved impact strength up to a certain point.

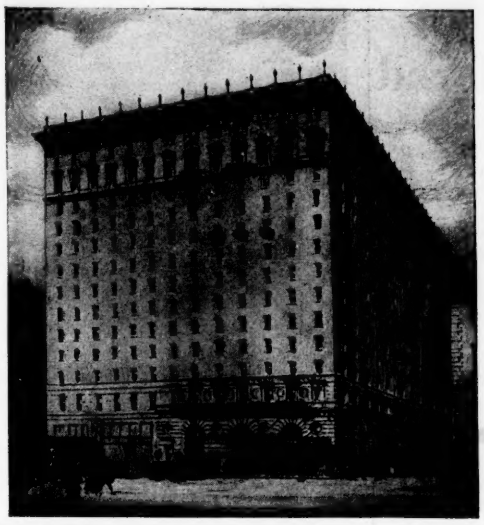
Mr. Gard stated that the most important step in the impact test is making the notch in the specimen. The slightest deviation from the size and shape of slot used as the standard will give widely varying results which are useless unless the data have previously been correlated by testing a large number of samples.

Carbon content must be low (0.18 to 0.25%) in nickel steels for low temperatures. Chromium proved to be detrimental. Valves and fittings are made of cast nickel steel.

In the discussion at the conclusion of Mr. Gard's paper, it was brought out that cast iron is unsatisfactory for low temperature use because of lack of uniformity and low impact strength.

Copper is beneficial as an alloying element but not as satisfactory as nickel in the same percentage.

A. S. M. Headquarters for Metal Congress



The Hotel Statler, Euclid Ave. at East 12th St., has been chosen as headquarters for the American Society for Metals during the National Metal Congress and Exposition, meeting in Cleveland, Oct. 19 to 23.

Reservations should be sent direct to the Hotel. Rates are as follows:

Room for one — $2.50, $3.00, $3.50, $4.00, $4.50, $5.00, $6.00, $8.00.

Room with double bed— $4.50, $5.00, $6.00, $6.50, $7.00, $8.00, $10.00.

Room with twin beds— $5.00, $6.00, $7.00, $8.00.

Room for three persons —$7.00, $8.00, $9.00, $10.00.

Suites for one—starting at $8.00.

Suites for two—starting at $10.00.

Prizes are Plentiful At Cleveland Outing

By Hugh E. Brown

The day was gray and cool but 190 members and guests could not be discouraged and turned out for the Cleveland Chapter's annual outing at Sleepy Hollow Country Club on June 11. They were rewarded with no rain.

Contests and prizes were plentiful. First prizes for golf in the various divisions were won by George Hales, George Frick, L. H. Norton, Emil Dubeck, and F. D. Ryan. Ralph Leo took the first prize in horseshoe pitching, and Kent Van Horn in ping-pong. Every member of the winning baseball team (Van Horn, James, Harris, Leo, Hester, French, Bates, and Wilson) and the umpire (Moranty) received a gift, and 11 door prizes were awarded.

Dinner at the Club was followed by a musical program, the presentation of prizes, and the showing of sound movies of American League baseball.

The Chapter is greatly indebted for this most successful day to the Outing Committee chairmanned by A. T. Code and consisting of Messrs. Howk, Critzer, Hales, Perry, and Huffman.

Philadelphia Climaxes Great Year With Trip to Phillipsburg and Ingersoll-Rand

Cloudless skies and balmy breezes lured ten thousand Philadelphians up the river to Phillipsburg to celebrate the conclusion of a most successful chapter year. Perhaps this figure is exaggerated a bit, but superlatives have become a habit in the Chapter. Certainly it was a most enjoyable outing.

The Ingersoll-Rand Co. provided ideal hosts. They displayed shops full of interesting work. They commandeered the buses to avoid the longer walks. And they treated the men to a luncheon that was a luncheon, when they were at their hungriest.

The Chapter's Annual Golf Tournament was held amidst the seventeen-year locusts on the historic Country Club of Northampton County Course.—historic because Ben Shepherd plays there.

T. Francis Conahan, Sun Oil Co. luminary, turned in a very classy 84 for his day's work. This, with his 11 handicap, was sufficient to win for him the Chapter Championship. This was not, however, until George J. Kaiser, with 101 and a handicap of 30, had been ruled out.

The trophy, a very handsome silver loving cup, is awarded annually by the Brown Instrument Co.

From golf to luncheon, to plant inspection, and then back to the Country Club for dinner was the order of the day. An orchestra drowned out the munching of chicken bones, and the gurgle of beer flowing over parched throats.

Then came the speeches. Chairman George Keller thanked Ingersoll-Rand Co. for the day's entertainment. Ben Shepherd welcomed the Chapter to Ingersoll-Rand. Tom Nelson, on behalf of the members, presented George Keller with a beaten silver cigar and cigarette box as a token of esteem.

Charles B. Cupp, Jr., who journeyed all the way from Williamsport to attend the meeting, expressed his pleasure at being there. And finally Tom Nelson accepted the office of Chapter Chairman for the coming season in a burst of applause.

Then the show began. And in all too short a time the members were pushed, carried, or poured into the buses for a midnight, moonlight ride back to the shadow of Billy Penn and home. The meeting was a fitting climax to a great year in the Chapter's history.

Two Chapters Join In Feats and Fêting

New Haven Goat Gores Hartford Lion on Golf Links

By L. E. Raymond

June 5 was, for the New Haven and Hartford Chapters, a day of feats and fêting. The outing began in the morning at Mill River Club in Stratford.

One A. H. d'Arcambal, having won the elimination tournament in Hartford, was present to defeat and otherwise subdue the New Haven champion in the game of skill known as cow-pasture pool. Having had no elimination contest, the names of all New Havenites present were placed in a hat and one name drawn to become the victim of the wild and roaring lion from Hartford. He was Ex-Chairman Henry Keshian, who feels that golf once in the spring and once in the fall is an abundance.

The Hartford lion led the New Haven goat away to slaughter on the links, but lo and behold, the goat gored the lion with a score of 110 to 117!

The group then adjourned to the bung-tossing activities at Eichner's Farm in Trumbull. The same representatives of the two chapters then became engaged in barnyard golf, and the mighty d'Arcambal once more found that he must bow his head to New Haven's meek but able Keshian.

However, in the Spanish athletics the conquering lion of Hartford was able to redeem himself nobly by throwing the bull higher and farther as well as spreading it thicker than any of the 156 members assembled.

The day was otherwise noted for its informality. The baseball game was particularly informal, and it was whispered by the losing team, quite irregular. The quoits were hurled with violence and nonchalance, and the Schlitz was consumed with gusto.

Liver and bacon and prauger sandwiches were followed by a barbecued steer. Door prizes and rewards won in the competitions were then distributed to the great satisfaction of the lucky recipients.

Carl-Mayer Corp. Formed

The Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, Ohio, has been organized to manufacture a complete line of industrial ovens and drawing and tempering furnaces. Carl Mayer, president, was formerly with Smith-Mayer Corp., oven and furnace builders, dissolved. C. A. Vining is vice-president.

Scale to Rate Normality of Steel Offered

Davenport Suggests Four Types Of Structural Normality

By A. J. Dornblatt

Washington Chapter, May 18—Although not the largest of the Society's many chapters, it is doubtful that any other can excel the Washington Chapter in the matter of total enthusiasm (even discounting that due to the preliminary thirst-chasers imbibed by the hundred-odd members at the May meeting).

The dinner was marked by the presentation of a farewell testimonial to Leon C. Bibber, who leaves Washington to take up his new duties as welding engineer for Carnegie-Illinois Steel Co. The Chapter presented the genial Mr. Bibber with a golf bag and set of tools to assist in digging out of the rough.

Corse Is New Chairman

The meeting was opened by Retiring Chairman S. J. Rosenberg, who turned the gavel over to the incoming chairman, W. M. Corse. Other new officers installed at this meeting are listed on page 8.

Mr. Corse then presented the retiring chairman with an engraved gavel as a token of the Chapter's appreciation for his services.

Speaker of the evening was E. S. Davenport, metallurgist, U. S. Steel Corp., Research Laboratory, who spoke on "Grain Size in Steel."

Several Grain Systems Explained

Mr. Davenport first explained briefly the several grain systems which can be observed microscopically in steel, such as austenite and ferrite grains, and pearlite colonies. His subject was confined to austenite grains.

Five methods of revealing austenite grain size in steel are (1) carbide network, (2) ferrite network, (3) fine pearlite network, (4) martensite etch, and (5) fracture methods. These include both carburizing and non-carburizing methods.

The speaker discussed typical grain growth behaviors as influenced by temperature and time in the austenitic range and touched briefly on the effects of certain alloy additions and deoxidation practices in restraining austenite grain growth.

Effect on Properties Discussed

The effect of austenite grain size on the properties of various steels was then taken up. Typical examples of the effects on fundamental transformation rate, hardenability or depth of hardening, impact strength and other mechanical properties were given.

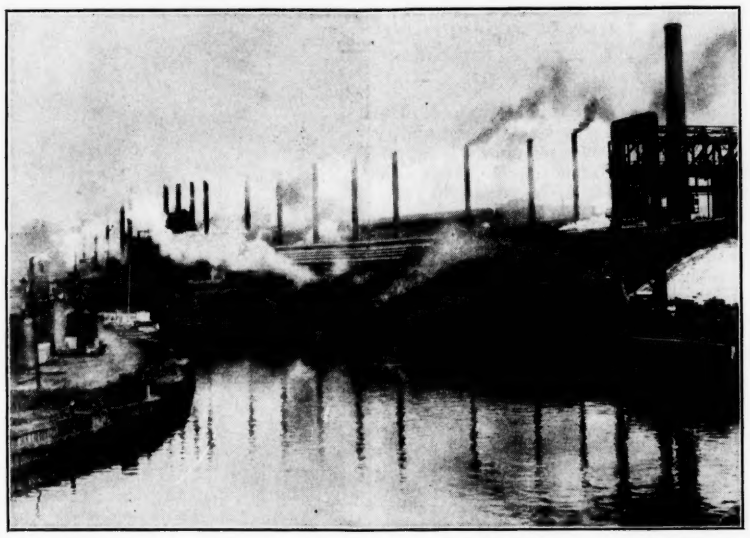
Structural "normality," as revealed in the high carbon case of carburized steels, was discussed and a "normality" scale consisting of four degrees or types of structural normality was suggested for the comparative rating of steels with respect to this characteristic.

Mr. Davenport presented his discussion in able fashion and the Chapter was very appreciative of his review of a subject that has been receiving much attention of late.

Distributor for Bethlehem Steel

Hill-Chase & Co., Richmond and East Ontario Sts., Philadelphia, is an authorized distributor for Bethlehem Steel Co. in the Philadelphia area. A complete range of Bethlehem tool steels is carried in stock at all times so that requirements of customers can be met promptly and efficiently.

Metal Congress Background



Industrial scene along the banks of the Cuyahoga River, Cleveland.

Cleveland Offers Ideal Facilities for Convention

(Continued from page 1)

The theaters in Playhouse Square have a combined seating capacity of 12,000; many excellent restaurants offer entertainment and dancing. The Metropolitan Park System encircling the city outskirts has been designed to retain its picturesque natural beauty. Other public parks offer amusements and bathing.

The Cleveland Museum of Art is one of the show places of the town. With four colleges and universities, including the well-known Western Reserve University and Case School of Applied Science, educational features abound.

Cleveland is indeed a proper setting for what will undoubtedly be the largest and most successful National Metal Congress in history.

Punch, Music, Dancing, Cards Entertain Chicago Wives and Sweethearts

By Milton A. Schreiner

Chicago Chapter, May 14—Members and guests of the Chapter gathered in the lobby of the Grand Ballroom of the Medinah Club around a golden punch bowl. Most important, they were accompanied by their wives and sweethearts for it was "Ladies Nite" in Chicago.

The punch was a good organizer, and the evening started with a feeling of informality and friendliness that carried through to the end of the party.

A real chicken dinner was served that pleased the most critical of the fair ones. Dinner music was furnished by the Hammond Organ Co., who later gave an organ recital.

A short business session was necessary for the election of officers for the coming year.

Past chairmen and chairmen of committees who have aided the chapter's progress with their untiring efforts were introduced to the ladies. Ken Hobbie's interpretation of the secretary and treasurer's report was very entertaining. Perhaps Ken is wasting his time in the steel business!

Dancing and cards followed the short business session and from the activity on the dance floor it was apparent that most of the steel men know more than the art of steel. The ladies present who did not get to Ladies Nite last year expressed their regrets and are looking forward to next year's event.

Corrosion Is Mainly Electrochemical in Nature Says Speller

By B. R. Queneau

Northwest Chapter, May 18—The annual meeting of the Northwest Chapter was a great success. Entertainment was furnished to the 100 members and guests by a trio, a singing clown, and by the toastmaster, Dr. Dowdell, who, as the "Gas Producer," drew the most laughs.

The main speaker of the evening, Dr. F. N. Speller, gave a brief but enlightening talk on corrosion. The point that corrosion is mainly an electrochemical phenomenon was brought out and the factors affecting corrosion were divided into two groups, primary and secondary.

The primary factors are those associated with the metal, such as composition or electrolytic potential; they determine the initial rate of corrosion. The secondary factors are those which vary with environment such as concentration of hydrogen ions, distribution of oxygen, nature of solution, temperature, etc. The environment affects the formation of the film covering the metal surface; when this breaks the metal corrodes. Thus any one metal will not resist all conditions, but will resist corrosion only where the surface film is preserved.

Many slides were shown giving the effect of oxygen, carbon dioxide, and humidity on the corrosion of various types of steel including plain open-hearth, copper steels and the new high strength steel known as Cor-Ten. The only low-cost steel to show much improvement in salt-water corrosion was Cor-Ten, which has approximately four times the life of plain carbon steel.

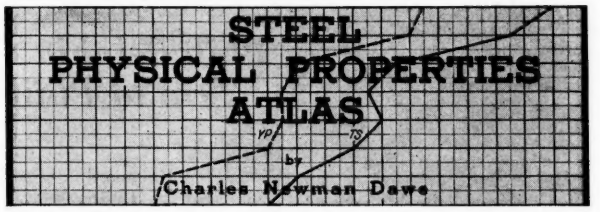
Soil corrosion was covered and the best methods of protecting pipe lines were given. Concrete is most satisfactory except in alkaline soils.

In conclusion, Dr. Speller stated that the problem is an economic one. The best metal to use is the one that will give adequate service for the desired time, at the lowest cost.

How Much Time Do You Spend Looking Up Physical Properties?

● How often have you spent hours at a time in search of exact physical property data on a particular steel? How often have you tried to find this information in the volumes of already published data?

Every one who works with steel knows how this information is scattered through the four corners of the metal industry. Now, for the first time, these data are concentrated in one authoritative reference book—it is available at a glance in



● The "Steel Atlas" is an authoritative new reference book on the physical properties of popular steels and steel castings with charts presented in three colors. Compiled in a new and unique manner and illustrated with thirty-five attractive graphs, you get at a glance the properties of steels as affected by carbon content, alloy content, heat treatment, tempering treatments and other influencing factors.

For the first time, engineers, designers, metallurgists, chemists and others engaged in the use of steels can have in one compact volume the authoritative physical property data they need. You will want this accurate reference book to physical properties of S.A.E. steels, cast steels, plates, rounds and 18-8 stainless steels and several of the new high tensile strength steels. Send order and check today.

90 Pages, 8½ by 11, very heavy paper, blue cloth binding, $2.50

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American Society for Metals

7016 Euclid Avenue - - Cleveland, Ohio

HERE AND THERE WITH A.S.M. MEMBERS

THE DUTIES of CARL H. MORKEN, recently appointed director of engineering sales for the Carondelet Foundry Co., St. Louis, Mo., will be in the development and sale of electric furnace iron castings for special applications, a field in which the Carondelet Foundry has been engaged during the past five years.

Ever since graduation from the University of Minnesota in 1922 with a degree in chemical engineering, Mr. Morken has been identified with foundry metallurgy. From 1922 to 1925 he was with several Minneapolis organizations and then became plant metallurgist for Ohio Brass Co., where his work involved both ferrous and non-ferrous foundry metallurgy. Since 1930 he has been foundry engineer for Detroit Electric Furnace Co.

* * *

CAST Iron Specialist HARRY A. SCHWARTZ, manager of research of National Malleable and Steel Castings Co., has been awarded the honorary degree of doctor of engineering by Case School of Applied Science.

Dr. Schwartz served for two years as chairman of the Cleveland Chapter of the Society and is responsible for many excellent contributions to the A.S.M. archives on the subject of cast iron. Few days before the commencement exercises he delivered the annual lecture to the Case Chapter of Sigma Xi.

JOSEPH V. EMMONS, well-known tool steel expert, and metallurgist at Cleveland Twist Drill Co., received the degree of metallurgical engineer at the same time.

* * *

CAMPBELL-Hausfeld Co. of Harrison, Ohio, manufacturers of gas and oil fired melting furnaces, have announced the appointment of GERALD B. DUFF, as sales representative in Metropolitan New York.

* * *

A NAME associated in many minds with the metallurgy of steel manufacture is that of CLARENCE E. SIMS, newly appointed research metallurgist at Battelle Memorial Institute, Columbus, Ohio.

Carl H. Morken *Clarence E. Sims* *Harry A. Schwartz*

Carl H. Morken has been appointed director of engineering sales for Carondelet Foundry Co., Clarence E. Sims is research metallurgist at Battelle Memorial Institute, and Harry A. Schwartz has received the honorary degree of doctor of engineering at Case School of Applied Science.

Mr. Sims is a chemical engineering graduate from University of Illinois with a degree in metallurgy from University of Utah. He served for some years as metallurgist in the U. S. Bureau of Mines before going to the American Steel Foundries, Indiana Harbor, Ind., in 1927 as assistant director of research.

Author of many papers and contributor to many technical discussions, Mr. Sims, with G. A. Lilliequist, was awarded the Robert W. Hunt prize of the American Institute of Mining and Metallurgical Engineers in 1933 for the paper "Inclusions, Their Effect, Solubility and Control in Cast Steel."

* * *

FOR THE past 4½ years engaged in the development and introduction of special high temperature, corrosion resistant alloys to the oil industry, EDWARD A. LIVINGSTONE is well prepared to become manager of alloy tube sales for Babcock & Wilcox Tube Co., Beaver Falls, Pa.

Before joining B & W in 1933, Mr. Livingstone was district sales manager for the A. O. Smith Corp. successively in Los Angeles, Tulsa, and New York City. This experience, together with his more recent special sales work in the oil industry, gives him a broad background for his new position.

* * *

PROMOTION of two A.S.M. members has been announced by Electro Metallurgical Sales Corp.

R. E. BROWN, Lehigh University graduate and associated with Electromet since 1920, has been made district manager of the San Francisco office. Mr. Brown has been engaged in metallurgical work and the sale of ferro-alloys on the Pacific Coast for the past 11 years.

New district manager of the Chicago office is S. C. DUTOT. He has been with Electromet Sales for 12 years, having previously been chemist at the Niagara Falls plant of Electro Metallurgical Co.

NEW assistant superintendent of merchant mills for Carnegie-Illinois Steel Corp. at Gary is ROBERT A. PETERSON, who was formerly with American Steel & Wire Co. in the Department of Manufacturing Practices covering the hot mills. His previous experience includes four years at Aetna Standard Engineering Co. in charge of heavy mill sales and ten years as superintendent of erection for Morgan Construction Co.

* * *

FOLLOWING the death of Sydney A. Smith, C. J. QUALTER, Mr. Smith's assistant for a number of years, succeeds him as manager of the Gear Department of Meisel Press Mfg. Co., Boston. Mr. Qualter will represent the company's sustaining membership in the Society.

* * *

ASSOCIATED Management Counsel was organized the first of this year as a firm of business consultants and managers — "a consulting, fact-finding, stimulating, and servicing organization"—whose fields of service range from executive administration to personnel problems, sales and market studies, and product development and engineering.

Chairman of the Counsel is A.S.M. Member MYRON H. CLARKE, an M.I.T. graduate with training in law. Mr. Clarke has formerly been general manager of 16 factories of United States Rubber Co., president of Tyer Rubber Co., in charge of operations of Johns-Manville Corp., assistant to the president of Crucible Steel Co. of America, and vice-president of Reading Iron Co.

His many affiliations include, in addition to the A.S.M., memberships in the American Society of Mechanical Engineers, American Society of Mining and Metallurgical Engineers, American Chemical Society, National Association of Cost Accountants, and Society for Advancement of Management.

* * *

HERMAN DIEDERICHS, Cornell professor and shining light in the Southern Tier Chapter, who acted as toastmaster for the highly successful Rochester-Southern Tier joint Chapter meeting in April, has been made a dean of the College of Engineering at Cornell University.

He is also director of Cornell's School of Mechanical Engineering and holder of the John Edson Sweet professorship of engineering.

Obituary

HORACE L. HIRSCHLER, consulting automotive engineer and former member of the Executive Committee of the Golden Gate Chapter, died May 25 following a long illness. Mr. Hirschler, a graduate of University of California, was also a member of the Society of Automotive Engineers and American Society of Mechanical Engineers, and past president of the California Camera Club.

* * *

TWENTY-EIGHT years of service for Meisel Press Mfg. Co. were terminated with the death on May 25 of SYDNEY A. SMITH, manager of the Gear Department. Mr. Smith was representative of the company's sustaining membership in the A.S.M.

FOR SALE

Large Leitz micrometallograph in good condition, complete with optical equipment, camera, etc. Apply box A.S.M. 50.

Two Speakers Discuss Pyrometer Equipment

By Louie W. Mosley

Los Angeles Chapter, May 15—Discussions on the subject of pyrometers and their principles of operation were presented by two speakers, Stanley F. Godfrey of Brown Instrument Co. and H. R. Abey of Leeds & Northrup Co.

Mr. Godfrey's subject was pyrometer equipment and covered many recent improvements.

Instruments of the thermometer type are used only for the lower temperatures. Thermo-electric pyrometers may be classified in two types, millivoltmeters and potentiometers. These are available as indicators, controllers, or recorders, and various combinations of these functions.

There are three types of thermocouples in general industrial service: Iron-constantan, chromel-alumel, and platinum-platinum rhodium. Iron-constantan is the lowest in cost and highest in e.m.f. developed for a given temperature but, due to temperature limitations, the other combinations must be used for the higher temperatures.

Millivoltmeter Types

The millivoltmeter type of pyrometer is simple, low in cost, and is direct reading. Millivoltmeters are available as indicators, indicating-controllers, recorders and recording controllers.

The potentiometer type gives readings which are unaffected by any normal resistance in the external circuit, and also affords the use of a much wider scale or chart.

Mr. Godfrey described the operation of various types of controllers. The simplest is known as the two-position or "on-off" type; this is not satisfactory for close control due to its tendency to "hunt." The three-position is next in simplicity; it affords a center, or third, position for the control valve.

Most uniform electric control is of the proportioning type which permits the valve to take the required selection of some 40 different positions. The closest type of control available is had through the medium of an air-operated valve.

The modern trend is toward the potentiometer, which is so sensitive that it will make a correction for a potential difference as small as 5/1,000,000 of a volt.

Optical and Radiation Pyrometers

Mr. Abey's subject was optical and radiation pyrometers, which are for extremely high temperature measurement. The optical pyrometer utilizes only a single band of the visible spectrum; the radiation pyrometer utilizes the total radiation.

The optical pyrometer makes use of monochromatic light, usually red, with which to measure the temperature or brightness of an incandescent object.

One of the easiest to operate is the disappearing filament type, in which a filament of calibrated luminosity is made to disappear in the field of the object being observed. With an experienced operator it is accurate to within less than 10° F., and has a range of from 1200° F. up.

The radiation pyrometer is accurate to within 10 to 25° F., and can be used for measuring temperatures from 1500° F. up. A recommended precaution is to observe the hot object from the proper distance.

The radiation pyrometer has the advantage of eliminating the personal element, which must enter into the readings of the comparator types of pyrometers.

Four Appointments Open For Research Associates

Four appointments as Research Associate will be available at Battelle Memorial Institute, Columbus, Ohio, for the year 1936-1937. These appointments are open to graduates of any accredited university or college.

They will be for one year's duration, and may be extended for a second year. The salary will be from $1200 to $1800 a year, depending upon the training and experience of the individual.

The research associates will be members of a new division of the Institute which will supplement the regular technical staff. The purpose of this new division is to offer intensive training in practical research to the best of the younger workers in selected branches of chemistry, metallurgy, fuels and ceramics.

Application forms and further information may be secured by writing the Director, Battelle Memorial Institute, Columbus, Ohio.

PREPRINTS OF CONVENTION PAPERS

The following papers, scheduled for presentation before the 18th National Metal Congress in Cleveland the week of Oct. 19, will be preprinted and will be ready for distribution about Sept. 15.

Any or all will be sent postpaid to members of the American Society for Metals upon request. Order by number according to list below.

1. **Metallic Single Crystals and Plastic Deformation**
   S. L. Hoyt, A. O. Smith Corp., Milwaukee, Wis.
2. **Creep Characteristics of Metals at Elevated Temperatures**
   C. L. Clark and A. E. White, University of Michigan, Ann Arbor, Mich.
3. **Interpretation and Use of Creep Results**
   J. J. Kanter, Crane Co., Chicago.
4. **Elastic Properties and Their Relationship to Strain Hardening**
   M. F. Sayre, Union College, Schenectady, N. Y.
5. **Effect of the Shape of the Test Piece Upon the Energy Needed to Deform Materials in the Single Blow Drop Test**
   O. W. Ellis, Ontario Research Foundation, Toronto
6. **Hot Working, Cold Working and Re-Crystallization Structure of Metals**
   N. P. Goss, Cold Metal Process Co., Youngstown, Ohio
7. **Factors Relating to the Production of Drop and Hammer Forgings**
   Adam Steever, Columbia Tool Steel Co., Chicago Heights, Ill.
8. **Hot Press and Upset Forging**
   J. H. Friedman, National Machinery Co., Tiffin, Ohio
9. **Extrusion of Metals**
   D. K. Crampton, Chase Brass & Copper Co., Waterbury, Conn.
10. **Cold Heading—Bolts, Rivets and Nails**
    R. H. Smith, Republic Steel Corp., Kent, Ohio
11. **Cold Forming Processes—Drawing Rods and Bars**
    J. E. Beck, Jones & Laughlin Steel Corp., Pittsburgh
12. **Cold Rolling of Mild Steel Sheets and Strip**
    Anson Hayes and R. S. Burns, American Rolling Mill Co., Middletown, Ohio
13. **Some Factors Affecting the Plastic Deformation of Sheet and Strip Steel and Their Relation to the Deep Drawing Properties.**
    Joseph Winlock, Edward G. Budd Manufacturing Co., Philadelphia
14. **Cold Working of Hollow Cylinders by Auto-Frettage**
    N. E. Woldman, Eclipse Aviation Corp., East Orange, N. J.
15. **Endurance of Gear Steels at Two Hundred Fifty Degrees Fahr.**
    A. L. Boegehold, General Motors Corp., Detroit.
16. **Recovery of Cold-Worked Nickel at Elevated Temperatures**
    Erich Fetz, Wilbur B. Driver Co., Newark, N. J.
17. **Slip Twinning and Cleavage in Iron and Silicon Ferrite**
    C. S. Barrett, G. Ansel and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh
18. **Some Effects of Small Additions of Vanadium to Eutectoid Steel**
    J. G. Zimmerman, R. H. Aborn and E. C. Bain, U. S. Steel Corp., Kearny, N. J.
19. **Conversion of Elongation Data from One Form of Test Piece to Any Other**
    E. J. Janitzky, Carnegie-Illinois Steel Corp., Chicago
20. **Behavior of Some Low Alloy Steels in the Single-Blow Drop Test**
    O. W. Ellis, Ontario Research Foundation, Toronto
21. **The Fracture of Carbon Steel at Elevated Temperatures**
    A. E. White, C. L. Clark, University of Michigan, Ann Arbor, Michigan; and R. L. Wilson, Timken Steel & Tube Co., Canton, Ohio
22. **The Effect of Titanium on Some Cast Ferrous and Nonferrous Metals**
    J. A. Duma, Norfolk Navy Yard, Portsmouth, Va.
23. **Effect of Titanium on the Hardness and Microstructure of Heat Treated 18 Per Cent Chromium Steel Ingots**
    R. E. Bannon, Titanium Alloy Manufacturing Co., Niagara Falls, N. Y.
24. **Magnetic Properties of a Series of Basic Open-Hearth Slag Samples**
    B. A. Rogers and K. O. Stamm, U. S. Bureau of Mines, Pittsburgh
25. **Basic Open-Hearth Slag Control**
    Earnshaw Cook, American Brake Shoe & Foundry Co., Chicago Heights, Ill.
26. **A New Tool for the Control of Quality Steel-Making**
    G. T. Motok, Republic Steel Corp., Cleveland.
27. **A Study of the Effect of the Aluminum Addition on the Structure of a Quenched Carbon Steel**
    H. W. McQuaid, Republic Steel Corp., Massillon, Ohio
28. **Notes on Continuous Gas Carburizing**
    R. J. Cowan, Surface Combustion Corp., Toledo, Ohio
29. **The Retarding Effect of Certain Metallic Elements on Graphitization**
    H. A. Schwartz, H. H. Johnson and C. H. Junge, National Malleable and Steel Castings Co., Cleveland.
30. **Cadmium Alloys for Bearings**
    C. F. Smart, Pontiac Motor Co., Pontiac, Mich.
31. **Physical Properties of Axle Shafts**
    H. B. Knowlton, International Harvester Co., Chicago.
32. **Effect of Overload on the Fatigue Properties of Several Steels at Various Low Temperatures**
    H. B. Wishart and S. W. Lyon, University of Illinois, Urbana, Ill.
33. **Austenitic Stainless Alloys: Their Properties and Characteristics**
    V. N. Krivobok and R. A. Lincoln, Allegheny Steel Co., Brackenridge, Pa.
34. **Further Study of a High Corbon High Chromium Tool Steel**
    W. H. Wills, Ludlum Steel Co., Dunkirk, N. Y.
35. **Equilibrium in the Reaction of Hydrogen with Iron Sulphide in Liquid Iron and the Thermodynamics of Desulfurization**
    John Chipman and Ta Li, American Rolling Mill Co., Middletown, Ohio
36. **Importance of Boundary Attack in the Etching of Steel Specimens**
    B. L. McCarthy, Wickwire Spencer Steel Co., Buffalo, N. Y.
37. **X-Ray Study of Preferred Orientations in Pure Cold-Rolled Iron-Nickel Alloys**
    D. McLachlan, Jr. and W. P. Davey, Pennsylvania State College, State College, Pa.
38. **Application of X-Ray Diffraction to the Study of Fatigue in Metals**
    C. S. Barrett, Carnegie Institute of Technology, Pittsburgh.
39. **Diffusion of Hydrogen through Nickel and Iron**
    W. R. Ham, Pennsylvania State College, State College, Pa.
40. **Influence of Aluminum on the Normality and Grain Size of Steel**
    G. R. Brophy and E. R. Parker, General Electric Co., Schenectady, N Y.

Use Alloy Iron to Improve Quality And Lower Costs

McCloud Reviews Ford Practice on Cast Iron at New York

By F. H. Clark

New York Chapter, May 18—Alloy cast irons and steels were developed by the Ford Motor Co. primarily to improve quality and lower costs, said J. L. McCloud, metallurgist, in a paper by R. H. McCarroll and J. L. McCloud of the Ford Motor Co. presented at the Chapter meeting.

Bill Eisenman, national secretary of the Society, was also present at the meeting and gave a friendly talk to the members. H. J. French presided as technical chairman.

Brake Drums are made by Ford of nickel-chromium cast iron with good wear characteristics. Cylinder blocks are of copper-alloyed iron with improved hardness, greater uniformity, and fine graphite particle size, copper having a "stabilizing" effect on graphite formation. Push rods are chill castings containing 0.75 to 1.00% copper, heat treated to remove casting strains, but without making the iron gray. Camshafts are cast with controlled chill so that only the tips are white; this is done by analysis and casting control only; there are no external chills or heat treatments.

Cylinder block iron utilizes hot metal from the blast furnace combined in mixers with cupola metal to required analysis. It is transferred to electric furnaces and temperature is adjusted for proper casting. Thence it goes to air furnaces acting as holding furnaces for the continuous pouring ladles.

Clutch pedals and truck rear axle housings are among the alloy cast steel parts made.

Over 2,000,000 cast steel crankshafts have been made and assembled. The reason for the copper, silicon, chromium alloy composition was given and the casting problems that have been solved were described. The properties of the metal and its heat treatment were given. Attention was called to the advantages in physical properties and the reasons for lowered costs in this and in other alloy types. Steel pistons and valve seat inserts were other cast steel parts described.

An active discussion followed. In reply to a question by H. J. French, Mr. McCloud stated that the Ford Motor Co. gets some castings made in other foundries.

Representatives Appointed

Direct factory representatives for the sale and service of all products of the American Electric Furnace Co. have been appointed as follows:

Earl E. Wright, Chattanooga, Tenn., for Eastern Tennessee.

A. D. Heath, 1701 North Illinois St., Indianapolis, Ind., for Indiana.

Clyde J. Boeringer, 7412 Race St., Pittsburgh, for Western Pennsylvania and West Virginia.

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Washington Navy Yard

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Postgraduate School
U. S. Naval Academy

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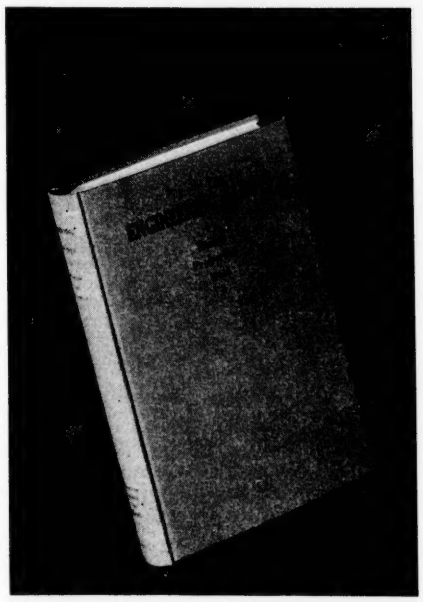

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SECTION 2.
Tradenames, composition, properties and uses of 8100 Alloys.

SECTION 3.
Typical uses for 8100 Alloys.

SECTION 4.
Alphabetical List of Alloy Manufacturers, and the alloys produced by each.

SECTIONS 5, 6, 7 and 8.
Bibliography, unclassified alloys, and important conversion tables, definitions and miscellaneous information about metals and alloys.

Every important commercical alloy in the world—more than 8100 of them—is listed in this alloy encyclopedia. For the first time you may have at your fingertips the tradenames, the properties, the composition, the uses and the manufacturers of the important alloys you sometimes wish to buy or use—but upon which you wish greater details.

Five years of painstaking effort on the part of the authors and the alloy manufacturers has made this book a virtual alloy dictionary. Its six hundred pages are packed with alloy information—efficiently indexed and cross-indexed for easy reference. If you buy or specify alloys, you should have this engineering tool on your desk. Or if you sell alloys, you will find this book a convenient reference to the makers and the characteristics of other alloys. It will give you the answers to your alloy problems.

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Flex-Arc Rays

Bulletins containing valuable information on arc welding are published by Westinghouse Electric & Mfg. Co. Bulletin Jyc-134.

Ni-Mo Alloys

A reprint from *Steel* on nickel-molybdenum cast alloys (trade name Cecolloy) is published by Chambersburg Engineering Co. Bulletin Jyc-132.

Forging Machines

The Acme Machinery Co. has just published an interesting bulletin on a distinctly new forging machine—the Model 35 Acme. This booklet illustrates and fully describes the new Acme Eccentric Header Slide which eliminates entirely the conventional Pitman construction. Bulletin Ox-39.

Drop Forgings

An attractive and comprehensive book on drop forgings has just been published by the Drop Forging Association. The book deals with the characteristics, qualities and uses of drop forgings and is a valuable addition to the library of any one interested in this subject. Bulletin Aya-123.

Air-Clutch Forging

Two bulletins are offered by Ajax Mfg. Co. One tells about their air-clutch forging machines in 2 to 7-in. sizes, made according to the most advanced design. The second is concerned with the Ajax-Hogue wire drawer, an attachment for heading machines which presents new economies. Bulletin Ox-105.

Die Steel Facts

A. Finkl & Sons Co. has collected a great deal of information on their Mo-Lyb-Die steels and Durodi hot work steel, presented in such form as to be a handbook on all phases of the subject. Bulletin Ob-23.

Forging Service

An illustrated folder shows a number of unusual equipments used in the shops of the Kropp Forge Co., including the acetylene torch pantograph, bar straightening equipments, etc. Bulletin Ox-77.

Conveyor Furnaces

Continuous chain belt conveyor furnaces handle miscellaneous parts without pans or trays —they are efficient, uniform, and flexible in operation. Improved furnaces of this type are described by Electric Furnace Co. Bulletin Ayx-30.

No-Contact Control

A book which should be in the hands of every man interested in temperature reading and control is the Data Book published by Thermo Control Devices, Inc., which describes a line of indicating and controlling pyrometers with Wheelco no-contact system of control. Bulletin Dx-110.

Bench Type Furnace

American Electric Furnace Co. has a new bulletin describing their new bench-type electric furnace for low cost, high speed hardening. It can be used for all types of high speed steel. Bulletin Jya-2.

Heat Treating Machine

A new continuous machine for atmosphere heat treating is covered by an American Gas Furnace Co. bulletin. A variety of treatments may be perfomed by passing different atmospheres through the muffle. Description is complete and interesting. Bulletin Jr-11.

New Hardening Method

The three vital factors in correct hardening are controlled by the new Vapocarb Hump hardening method, described in a Leeds & Northrup bulletin. These factors are quench point, heating rate and furnace atmosphere. Bulletin No-46.

Kanthal Alloys

C. O. Jelliff Mfg. Co. offers a descriptive booklet on Kanthal alloys. Certain of these alloys may be used as resistance elements; others are for furnace parts or other heat resisting applications. Full details are given in Bulletin Je-78.

Vertical Carburizer

The Hevi Duty electric vertical retort carburizer is particularly applicable to intricate parts and selective carburization, where distortion must be held to a minimum. It is described in Bulletin Mya-44.

Furnace Insulation

Johns-Manville offers to those who design or operate furnaces a new 72-page book describing insulation methods which improve performance and reduce operating costs. Requirements for each particular type of heating equipment are analyzed and detailed recommendations made accordingly. Bulletin Ox-100.

Silico-Manganese Steel

Silico-manganese steel for heavy springs is the subject of Bethlehem Steel Co.'s new folder giving its properties and recommendations for heat treatment. Bulletin Jyx-76.

Lenses and Prisms

Bausch & Lomb Co.'s new 18-page indexed catalog contains full descriptive information and price list for their complete line of lenses, prisms and mirrors. Bulletin Jyc-35.

Free Cutting Steel

Jones & Laughlin Steel Corp. has published in attractive booklet form a record of 15 years of research by their metallurgical department into the machinability of free cutting steels. Bulletin Ob-50.

Cutting Steel

Recommended practices for gas cutting of structural steel are given in a concise and authoritative form by Linde Air Products Co. Qualification tests for good workmanship from the standpoint of accuracy and smoothness of cuts are also described. Bulletin Dc-63.

Luxit

"Luxitize your cupola," says Alpha-Lux Co., and gives complete directions for lining cupolas, brass furnaces, crucible furnaces, ladles, and patching with this material. Bulletin Myb-120.

Multiple Tables

Ten convenient and simple tables in this booklet by Timken Steel & Tube enable the steel user to tell at a glance either how long his stock must be to furnish a definite number of multiples, or how many multiples can be cut from a given length of stock. Bulletin Dc-71.

Moly Cast Iron

The use of molybdenum in foundry practice, both on steel and cast iron, is described in a handsome booklet by Climax Molybdenum Co., which presents accurate technical information in a striking and modern manner. Bulletin Jyc-4.

Blowers

A folder devoted to the application of rotary positive blowers in foundry cupola service, issued by Roots-Connersville Blower Corp., discusses in detail the structural and operating features of these blowers. Bulletin Jyc-131.

Drop Hammers

Erie Foundry Co. has an illustrated bulletin giving complete information on modern practice with steam drop hammers. Bulletin Jyc-130.

Forging Stainless

Steel Improvement & Forge Co. has a folder illustrating forging machines for stainless steel and giving information on the process. Bulletin Jyc-133.

Spoilage Insurance

C. I. Hayes, Inc., has compiled a record of reports from over 300 users of their "Certain Curtain" controlled atmosphere furnaces showing how these furnaces have cut down spoilage in the heat treatment of tools. Bulletin Sx-15.

Blast Cleaning

So many changes have taken place in blast cleaning and dust collecting equipment in the past three years that Pangborn Corporation's "quick reference" catalog of condensed information will be invaluable to all those interested in this subject. Bulletin Jyc-68.

Nickel Steel Stock

International Nickel Co. has issued an extremely useful Buyer's Guide to Warehouse Stocks of Nickel Alloy Steels. The distributors listed are in a position to give competent metallurgical advice on the proper composition and treatment for specific applications. Bulletin Jyc-45.

Heat Treating Manual

A folder of Chicago Flexible Shaft Co. contains conveniently arranged information on heat treating equipment for schools, laboratories and shops, and also illustrates the several types of Stewart industrial furnaces. Bulletin Ar-49.

Recuperators

Results obtained with Carborundum Company's recuperators using Carbofrax tubes are fuel savings, closer temperature control, faster heating, and improved furnace atmosphere. Complete engineering data are given in Bulletin Fx-57.

Resistance Wire

A complete catalog of the various types of electric resistance wires made by Hoskins Mfg. Co. has been issued. Complete numerical data are included on all types, along with some fundamental facts about heating units. A handy, small size, 48-page booklet. Bulletin Jyb-24.

Stainless Data Book

All users of stainless and heat resisting alloys should find invaluable the information contained in a booklet published by Maurath, Inc., giving complete analyses of the alloys produced by the different manufacturers, along with the proper electrodes for welding each of them. Bulletin Jyb-125.

Coated Electrodes

General information on welding with coated electrodes is supplemented by complete descriptive data on all brands of electrodes manufactured by Metal & Thermit Corp. in a revised edition of their catalog. Bulletin Jyb-64.

Cutting Oils

The problems of machine tool lubrication engendered by the high speed production and close tolerances of modern industrial operations are discussed and progress in cutting oils during the past few years reviewed in a booklet by D. A. Stuart & Co. Bulletin Jyb-118.

Heroult Furnace

A complete exposition of the Heroult electric furnace is carried through in logical style in an exceedingly handsome illustrated booklet by American Bridge Co. Salient features, types, sizes and capacities, suggestions for installation, auxiliary equipment and practical advantages are given. Bulletin Jyb-124.

Steel Handbook

A handbook has been prepared by Heppenstall Co. covering the effects of alloying elements and the physical properties of steel in forged sections. Such valuable data as heat treating definitions, McQuaid-Ehn grain size classification, hardness conversion tables, and physical property tables are included. Bulletin Jyb-122.

Controlled Atmosphere

Examples of how SC controlled atmosphere furnaces for bright annealing can reduce production costs are contained in an illustrated folder by Surface Combustion Corp. Bulletin Jyb-51.

Thermometers

A 48-page bulletin is packed with worthwhile information on all phases of thermometry. It also contains detailed descriptions and applications of each type of Foxboro thermometers. Bulletin Jyb-21.

Newer Tool Steels

Vulcan Crucible Steel Co. has a complete and attractive catalog listing their full line of tool steels including many special types to meet the modern trends in industry. Bulletin Jyb-127.

Welding Enduro

An invaluable textbook for every manufacturer making articles of stainless steel is a new publication by Republic Steel Co. on the fabrication of all sorts of stainless steel products by welding. Bulletin Jyb-8.

Heat Treating Baths

An attractive booklet outlines the types and uses of heat treating baths made by A. F. Holden Co. Possible savings in the entire range of hardening room requirements are indicated. Bulletin Myb-55.

Stainless Steel Facts

Carpenter Steel Co. offers (to manufacturers in U.S.A. only) a booklet, designed in handy file folder form, presenting a wealth of data on Carpenter stainless steels. A good reference source of material. Bulletin De-12.

Metallographic Polishing

The Guthrie-Leitz automatic polishing machine is designed to eliminate all elements of the human equation which make the hand preparation of metal specimens so undependable. Described in Bulletin Jyx-47.

Furnace Control

How the Lindberg Control functions in balancing the rate of heating of a furnace or oven with the varying heat requirements is told in an attractive new bulletin issued by Lindberg Engineering Co. Bulletin Myb-66.

Centrifugal Castings

Centrifugal casting of stainless, heat and corrosion resisting alloys eliminates impurities and cooling strains and permits thinner and more uniform walls than any other method. This is explained in a bulletin by Michigan Steel Casting Co. Bulletin Nx-84.

New Stainless Booklet

USS chromium and chromium nickel steels are thoroughly discussed in a beautiful booklet offered by United States Steel Corp. and its subsidiaries. Information on 8 types of stainless is given. Bulletin Fb-96.

Convected Air Furnace

A novel application of the principle of mechanical convection to transfer heat uniformly around and through parts being heat treated is provided by a patented rotary fan. This equipment is incorporated in the convected air tempering furnaces described by Despatch Oven Co. in Bulletin Myb-123.

Screw Machining

Screw machine products of aluminum are treated in authoritative and extensive manner in a booklet of Aluminum Co. of America. Besides general data on screw machining, a number of very useful tables appear. Bulletin Ar-54.

Corrugated Ingots

The Gathmann Engineering Co. has published a new booklet called "Gathmann Ingot Molds—Their Purpose and Design." It illustrates various corrugated ingot contours designed to produce defect-free surface in steel ingots. Bulletin Aya-13.

Burners and Valves

Auxiliary equipment for industrial furnaces that will insure proper heat production and correct combustion, such as oil and gas burners, blowers, regulating and shut-off valves, is fully described in Mahr Mfg. Co.'s illustrated booklet. Bulletin Jyx-5.

Nickel-Copper Steels

Exceptional resistance to corrosion and abrasion, increased tensile strength, and higher ductility are the qualities claimed for Youngstown Sheet & Tube Co.'s new series of Yoloy steels. A summary of properties and notes on their characteristics are contained in Bulletin Ox-93.

Tool Steel Catalog

A new catalog lists and describes the complete line of tool steels manufactured by Columbia Tool Steel Co. Bulletin Mya-115.

Neophot

"Neophot" is the name of a new metallograph of radically new design and universal adaptability. A pamphlet distributed by Carl Zeiss, Inc., gives its applications and features and is well illustrated with beautiful samples of micrographic work. Bulletin Jx-28.

Castings for High Heat

The compositions, properties and uses of Driver-Harris Co.'s Nichrome, Chromax, and Cimet, and other alloys for high temperature and corrosion resistance are given in a new illustrated folder. Bulletin Nx-19.

Turbo Compressors

The new items in Spencer Turbine Co.'s bulletin are a new and smaller "Midget" turbo for individual mounting, a single-stage line which effects new economies, and the gas-tight turbos for acid and explosive gases. Bulletin Mx-70.

Heat Resisting Alloys

Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Ni-Cr Castings

Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Liquid Carburizing

E. F. Houghton's Perliton liquid carburizer is the subject of a 23-page booklet. Depth of case, speed of penetration, and other results are well illustrated with graphs and photomicrographs. Bulletin Nv-38.

Testing with Monotron

Shore Instrument & Mfg. Co. offers a new bulletin on Monotron hardness testing machines which function quickly and accurately under all conditions of practice. Bulletin Je-33.

Compressors

B. F. Sturtevant Co. has a line of centrifugal compressors designed particularly for industrial furnace applications. These are illustrated and described in Bulletin Myx-58.

Rockwell Tester

The Rockwell Superficial Hardness Tester is applicable to far thinner sheet and strip than the regular Rockwell. Its use for nitrided and case hardened parts is also described by Wilson Mechanical Instrument Co. in Bulletin Myx-22.

Overlay Metal

Colmonoy is a new wear resistant, corrosion resistant, and heat resistant product in the form of metal crystals which may be impregnated into a ferrous base metal for applications requiring severe service. It is made by Colmonoy, Inc., and described in Bulletin Jyb-129.

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Metallic Bellows May Be Manufactured By Rolling or by Hydraulic Pressure

By W. A. Gibson

Detroit Chapter, May 11—The principle that most of us are unfamiliar with the manufacture and requirements of common articles of every-day use was well illustrated by H. M. St. John, metallurgist, Detroit Lubricator Co., before the Non-Ferrous Section of the Detroit Chapter. His subject was, "Manufacture and Uses of Metallic Bellows."

A metallic bellows is a flexible metallic member, impermeable to gases and liquids at considerable pressure and capable of substantial change in length and volume.

The most common methods of manufacture are by rolling and by hydraulic pressure. A seamless tube having a wall thickness between 0.005 and 0.010 in. is drawn from sheet. In the rolling method a bellows is formed by tools performing a spinning operation. In the hydraulic method the tube is placed in a die and hydraulic pressure applied at the same time as longitudinal pressure.

Another method is by soldering a number of diaphragms at the edges. Attempts have also been made to manufacture bellows by means of electrodeposition — an interesting possibility.

Mr. St. John listed a number of desirable properties of bellows such as long life, rigidity against pressure, high and uniform flexibility, resiliency, and resistance to corrosion. The most common causes of failure are high stresses resulting from improper design or application, corrosion, and fatigue failure.

Most bellows are made of a composition containing 80% copper and 20% zinc, but many other metals are used for special purposes. Even sterling silver has occasionally been used.

During the talk the speaker touched lightly on the influence of mechanical features on the design, and several questions asked during the discussion gave him an excellent opportunity to launch into mathematical formulae. He presented just enough information on this subject to show that a mathematical analysis of bellows is too complicated for an open meeting.

Employment Service

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METALLURGIST: With broad general training and experience, excellent record for past ten years, desires new connection. French, German, Spanish, and Russian at command. Essentially consulting metallurgical engineer to aid others in correct selection of metal materials and proper thinking on metallurgical problems. Box 7-5.

M.I.T. GRAD: Mechanical and metallurgical engineering, Sc.D. degree. Taught metallography and heat treatment at M.I.T. for two years. Some consulting experience, principally in corrosion problems. One summer of commercial research on electrical cables. Box 7-10.

METALLURGIST: Age 28; specializing in heat treatment of high speed and alloy steels. Technical education; four years experience as tool hardener for highly rated manufacturer. Now ready for responsible metallurgical position with progressive organization. Box 7-15.

SUPERVISOR, inspector or instructor of arc welding; steel or welding equipment salesman. Practical man; 8 years experience; knowledge of metallography, heat treating and physical metallurgy. Member A.S.M. and A.W.S. References. Box 5-15.

EXECUTIVE METALLURGIST, metallographer, lecturer, teacher, author. Experience steels, non-ferrous metals, thermostatic and high expansion metals, tinsel tape, contact metals, amalgams, solders, etc. Six years experience on telephone material problems. Patents pending. Box 7-20.

METALLURGICAL ENGINEER, 26 yrs. old, single, having had considerable experience in cast iron metallurgy desires metallurgical position dealing with the commercial production of cast iron. Fine references. Box 7-25.

Local Industries Night Held

By C. M. Stevenson

St. Louis Chapter, May 15—Election and "Local Industries" night was held by the St. Louis Chapter with an attendance of almost 100.

After the election of officers the Granite City Steel Co. presented a talking motion picture of "A Story in Steel" which was very interesting as well as educational.

William D. Thompson of Laclede Gas Light Co., one of the old reliable standbys of the St. Louis Chapter, then presented a fine talk on "Industrial Gas Applications" discussing and illustrating with slides the various methods of manufacturing in which gas plays an important part.